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MIDDLE YELLOWSTONE AREAWIDE PLANNING ORGANIZATION AND CARBON COUNTY

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TABLE OF CONTENTS

MYAPO BOARD OF DIRECTORS.....i

MYAPO TECHNICAL COMMITTEE.....ii

MYAPO STAFF.....iii

WHY MYAPO?.....iv

PRELIMINARY FACILITY PLANS.....x

CARBON COUNTY NEWS.....xi

I. HISTORICAL OVERVIEW.....1

A. Population.....4

B. Employment.....4

II. THE BASIC INDUSTRIES OF THE MYAPO REGION.....10

A. Agriculture.....10

B. Mining.....12

1. Coal.....12

C. Recreation-Tourism.....14

III. THREE ALTERNATIVE FUTURES FOR THE MYAPO REGION.....16

A. County Projections.....17

1. Carbon County.....17

2. Community Population.....19

IV. THE BASIC INDUSTRIES OF THE MYAPO REGION AND THEIR VULNERABILITY TO CHANGES IN WATER QUALITY STANDARDS OR WASTE WATER CONTROL PROCEDURES.....21

A. An Example Involving a Reduction in Agricultural Earnings in Carbon County.....21

LIST OF TABLES

I-1 Age Distribution in the MYAPO Region, Montana, And the United States, 1960.....2

I-2 Age Distribution in the MYAPO Region, Montana, And the United States, 1970.....3

I-3 Population of the MYAPO Region and Each County, 1960, 1970, and 1975.....5

I-4 Racial Composition of MYAPO Region Population 1960 and 1970.....6

I-5 Sex Distribution by County and Regional Total 1960 and 1970.....7

I-6 Labor Force, Employment, and Unemployment Rate of The MYAPO Region, Montana, and the United States 1960 and 1970.....8

I-7 Unemployment Rates MYAPO Region, Montana, and the United States, 1970 Through 1975.....9

I-8 Median Family Income MYAPO Region, Montana, and the United States, 1960 and 1970.....9

II-1 Agricultural Employment 1973.....10

II-2 Agricultural Employment 1960 and 1970.....11

II-3 Coal Production in the MYAPO Region (Tons).....13

II-4 Recreation and Tourism Employment MYAPO Region 1973.....14

III-1 Employment Projections for Carbon County.....18

III-2 Personal Income Projections for Carbon County.....18

III-3 Community Populations, 1970 and 1975, MYAPO Region.....20

IV-1 Evaluation of the Effect of a Reduction in Farm Earnings Per Worker in Carbon County.....22

MYAPO Board of Directors

	County Represented
JOHN BESEL, Co. Commissioner Big Horn County Courthouse Hardin, MT	Big Horn County
BJARNE BJORNDAL, Co. Commissioner Sweet Grass County Big Timber, MT	Sweet Grass County
ELIZABETH BRENNAN, Councilwoman 1st Ward, City of Hardin Hardin, MT	Big Horn County
McLEAN CLARK, Secretary/Treasurer Mayor of Big Timber Big Timber, MT	Sweet Grass County
FRANK COLE, President Carbon County Commissioner Red Lodge, MT	Carbon County
RODNEY FINK, Vice-President Sanitarian - Stillwater and Carbon Counties Columbus, MT	Stillwater County
HUGO GOLFI Red Lodge, MT	Carbon County
MURR ISAACS, Engineering Tech. Engineering Department Laurel, MT	Yellowstone County
JIM KRAFT, Director Civil Defense, City Hall Billings, MT	Yellowstone County
DANIEL C. OLD ELK SR., Project Officer Crow Tribal Water Resources Commission Crow Agency, MT	Crow Reservation Big Horn County
ED STOW, Chief of Environmental Sciences City/County Health Department Billings, MT	Yellowstone County
JIM WEISGERBER Bridger, MT	Carbon County

MYAPO Technical Committee

	County Represented
CLINT BISHOP, Regional Fishery Mgr. Montana Fish and Game Dept. Billings, MT	Yellowstone County
JERRY D. DYKSTRA Roberts, MT	Carbon County
RODNEY FINK, Sanitarian Carbon-Stillwater Counties Columbus, MT	Stillwater County
GEORGE FREEMAN , Vice-Chairman Director City-County Planning Board Billings, MT	Yellowstone County
RICK GOLD, Regional Hydrologist Bureau of Reclamation Billings, MT	Yellowstone County
JACK L. GRIBBLE, Director Carbon County Planning Office Red Lodge, MT	Carbon County
ALF HULTENG Water Quality Bureau Billings, MT	Yellowstone County
ELLEN KAYE, Consultant Northern Plains Resource Council Billings, MT	Stillwater/Yellowstone Counties
TOM KELLY, Planner Stillwater County Courthouse Columbus, MT	Stillwater County
ROY LEMBKE, Range Conservationist Bureau Land Management Billings, MT	Yellowstone County
TOM LIPPERT, Sanitarian Hardin, MT	Big Horn County
ROBERT H. MADSEN, Study Manager Yellowstone Level "B" Missouri River Basin Commission Billings, MT	Yellowstone County

MYAPO Technical Committee (Cont)

	County Represented
ROBERT W. MILLER, Ass't. Forest Supervisor Custer National Forest Billings, MT	Yellowstone County
RUSTY ROKITA, Field Assistant Mont. Dept. of Community Affairs Billings, MT	Yellowstone County
MIKE SIERZ, Director Sweet Grass County Planning Big Timber, MT	Sweet Grass County
STEPHEN R. SMITH, District Conservationist Soil Conservation Service Columbus, MT	Stillwater County
TOM SMITH, Environmentalist Montana Power Company Butte, MT	All Counties
GERALD F. WEBER, County Extension Agent Carbon Co. Extension Service Joliet, MT	Carbon County
JAMES YEDLICKA, Chairman Supervisor Soil Conservation District Fromberg, MT	Carbon County

MYAPO Staff

ALLEN E. BOND, Project Director

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Billings, MT 59101

WHY MYAPO?

1. *What does MYAPO stand for?*

   It stands for the Middle Yellowstone Areawide Planning Organization.

2. *What does Section 208 mean?*

   This is the section of Public Law 92-500, or the National Water Pollution Control Act, Amendments of 1972 (NWPCA-A 1972) that authorizes the Environmental Protection Agency (EPA) to conduct and fund this program.

3. *What is MYAPO doing?*

   It is developing an areawide water pollution control plan. EPA states it a little differently, i.e. "An Areawide Waste Treatment Plan".

4. *What does "areawide" mean?*

   It means that the planning area encompasses more than one county. We are planning for five (5) counties: Big Horn, Carbon, Stillwater, Sweet Grass, and Yellowstone; and the Crow Indian Reservation.

5. *Who determined which counties should constitute the planning area?*

   The Governor of Montana designated the boundaries of the planning area -- sometimes these coincide with economic districts, drainages, or however the Governor decides.

6. *Are there any other designated APOs in Montana?*

   Yes, three others: the Yellowstone-Tongue with six (6) counties and the Northern Cheyenne Indian Reservation, the Blue Ribbons of the Big Sky County with Gallatin and Madison Counties, and the Flathead Drainage with Flathead and Lake Counties.

7. *Will this plan go the route of many other plans, that is to the shelf where it will collect dust?*

EPA stresses that this plan is to be implemented; therefore, it must be economically, environmentally, socially, and institutionally sound.

8. *How much is this program costing the taxpayers?*

The total grant is for $735,000.00. $200,000.00 is to be used for the Crow Tribe subagreement. There is no cost sharing. This is a 100% grant by EPA.

9. *Why should Montanans be concerned about water pollution since most of our streams have high quality water?*

Public Law 92-500 charges EPA to establish water pollution control throughout all of the States. The planning is to cover a twenty (20) year period. Many developments may occur during this time which may change the quality of our waters. For example, in our APO area, hard rock mining may become a reality in the Stillwater Complex. Certainly extensive coal mining will be initiated within the next 20 years in Big Horn County and possibly in Carbon and Yellowstone Counties.

10. *What are the goals of Public Law 92-500?*

The primary aim of the Act is to "restore and maintain the chemical and biological integrity of the Nation's waters". By 1983, wherever possible, water quality is to be suitable for recreational contact and for protection and propagation of fish and wildlife. A further national goal is to eliminate the discharge of pollutants totally by 1985. (This is not a legal binding requirement, however.)

11. *How does the EPA expect to achieve these goals?*

a. EPA has developed an expanded system of federal grants to plan (Facility Planning) and construct (Title II - Grants for Construction of Treatment Works) publically owned waste treatment plants.

b. A permit program (the National Pollution Discharge Elimination System - NPDES permits) has been established and geared to restricting pollutant discharges from point sources (discernible, confined and discrete conveyances, including ditches).

c. Nonpoint sources pollution control is to be achieved by the 208 Program outputs.

12. How is MYAPO organized?

It is a local, five (5) county (and the Crow Tribe) organization. The Board of Directors consists of thirteen (13) members who are representatives of the five (5) county commissions, the Crow Indian Reservation, and the cities or towns of Big Timber, Billings, Bridger, Fromberg, Hardin, Laurel, and Red Lodge. A Technical Committee of approximately twenty (20) members has been formed from all levels of government within the five county area. This group consists of planners, sanitarians, engineers, environmentalists, agriculturalists, and one industrialist. The President of the Board is Frank Cole, Jr., County Commissioner of Carbon County; the Vice-President is Rodney Fink, Sanitarian of Stillwater County; and the Secretary/Treasurer is McLean (Mac) Clark, Mayor of Big Timber. An Executive Committee functions occasionally and consists of the President, Vice-President, Secretary/Treasurer, and two (2) members at large from the Board. The staff consists of a project director, a planner, a public relations person, and a secretary. A water quality specialist from the Water Quality Bureau is assigned to the project.

13. How is MYAPO's Program structured?

Our program is divided into a set of general tasks which are: Administration; Water Quality; Agricultural Nonpoint Source Assessment; Mining, Silviculture, and Construction Nonpoint Source Assessment; Air Quality, Residual Wastes and Land Disposal Evaluation; Facility Planning; Land Use Planning (including Demographic and Economic Projections); Management (including Legal Management); Crow Tribe Administration; and Crow Tribe Subagreement.

14. Is there planning in the nondesignated areas?

Yes, this is performed by the Water Quality Bureau of the State Department of Health and Environmental Sciences.

15. Since the State Water Quality Bureau has control of municipal and industrial waste discharges through the NPDES permit program, what is the thrust of the 208 Program?

The thrust of our program is in nonpoint source pollution control management. That pollution which enters the natural waters without passing through discreet conveyances, pipes, ditches, drains, etc. is considered nonpoint in origin and is related to activities in agriculture, mining, silviculture, construction, and urban runoff. All contribute various forms of pollution; most of these may be controlled in varying degrees by applying good management practices. Therefore, a set of goals of the program is to develop Best Management Practices for each nonpoint source of pollution. Another set of goals is to develop plans for implementation.

16. *Since EPA provides the funds, does EPA establish or dictate policy?*

There is close coordination between MYAPO, EPA, and the State Water Quality Bureau. Direction is given and expertise is offered, but EPA's control is limited by the conditions of the grant agreement. However, EPA does control the funds, and this is persuasive.

17. *What is the thrust in your water quality program?*

The goals of this program are to identify water quality problems, present and potential [over a twenty (20) year period], and to develop programs and solutions. The consultant is the firm of Hurlbut, Kersich, and McCullough, and the amount of the contract is $53,970.00. The study has been divided into three (3) general categories: surface water quality, subsurface water quality, and development-urban runoff.

18. *How are the problems identified and processed?*

The problems have been obtained from the Technical Committee and from the public as a result of public participation meetings in each county. The consultant has also developed problems from the literature review and personal information. A method has been developed for the examination of problems, i.e., The Problem and Solution Documentation Procedure. A simplified version of the program flow is: identify candidate problems, determine specific problems, finalize problems and assign final priority, develop candidate solutions, determine specific solutions, and select recommended solutions.

19. *What is residual waste?*

It is solid, liquid, or sludge substances from man's activities. Our Residual Wastes Program has not been initiated, but contract negotiations have started.

20. *Will your agricultural nonpoint source program place additional burdens upon the farmers and ranchers to control pollution?*

It could be burdensome for the control of some forms of pollution; that remains to be seen. However, the thrust of the program will be to identify agricultural practices that are contributing pollution (sediment, generally speaking), to establish treatment procedures by applying Soil Conservation Service (SCS) Handbook methods, and to recommend to the United States Department of Agriculture (USDA) that these water quality conservation practices be funded realistically through the Agricultural Stabilization and Conservation Service (ASCS) on a cost share basis.

21. *Do you expect to achieve control without becoming involved with permits and enforcement?*

That is a good question. Some of our problem streams may have substantial sediment generated as a result of poor range management practices; some irrigation return flows may return sediment, but frequently this load is less than the load that is originally picked up in the ditch; waste spilling may or may not be a problem; poor irrigation practices may accelerate channel erosion; there are other sediment producing agricultural practices. However, in our MYAPO district there is also much natural erosion of stream banks due to the erosive nature of the soils; contribution from agriculture is probably not as great as it is frequently made out to be. An incentive approach has merit, and with reasonable cooperation from the farmers and ranchers significant reduction in sediment from poor agricultural practices will be achieved.

22. *Do you expect to use an incentive program to control NPS pollution in mining, silviculture, and construction?*

No. It is possible that laws on the books cover these situations. This is being determined by our legal consultant who may determine that a comprehensive erosion

and sediment control law is needed. It probably would require that plans for sediment control measures on small operations be submitted to some agency, and that those planning extensive projects obtain permits which would hold the permittee to complete performance of the submitted plan.

23. How are you going to implement the plan?

This question cannot be answered at this time. All point source aspects of the plan will probably be implemented by the State Water Quality Bureau. As was previously mentioned, there may be adequate laws on the books to achieve NPS pollution control. New erosion and sediment control legislation may have to be drafted. The Conservation Districts may perform various functions in implementation. It may be feasible to establish an areawide planning and implementation office. These alternatives and others will be examined, and the best approach will be promoted. The public will have an opportunity to participate in the planning process.

Preliminary Facility Plans

BIG HORN COUNTY

City	Consultant
Lodge Grass	Mueller Engineering, Inc. of Billings Robert Sanderson

CARBON COUNTY

City	Consultant
Bearcreek (under consideration)	Hurlbut, Kersich, & McCullough of Billings David McCullough
Fromberg	Morrison-Maierle, Inc. of Billings Larry Larsen

STILLWATER COUNTY

City	Consultant
Fishtail	Mueller Engineering, Inc. of Billings Robert Sanderson
Reed Point	Morrison-Maierle, Inc. of Billings Larry Larsen

SWEET GRASS COUNTY

City	Consultant
Big Timber	Wenzel and Company of Great Falls Jim Heberly

YELLOWSTONE COUNTY

City	Consultant
Billings Heights-Lockwood	Christian, Spring, Sielbach & Associates of Billings Gerald Gaston
Huntley	Morrison-Maierle, Inc. of Billings Larry Larsen x

THE CARBON COUNTY NEWS

How Much Water?

1/22/76

Clarks Fork Under Study

A critical water use study of the Clarks Fork of the Yellowstone River began Jan. 1 under the leadership of the Missouri River Basin Commission (MRBC).

"The study will provide an analysis of potential energy, agricultural, and other developments on water and related land resources," according to MRBC Assistant Study Manager for Montana, Keith H. Corrigall, Helena.

Far-Reaching Goals

"The study will involve state and federal agencies, interested gourps and organizations, industry, farmers and ranchers, and private individuals. It will consider national, regional, state, and local objectives and goals. The study is being conducted concurrently with the State of Montana Department of Natural Resources and Conservation efforts to develop a State Water Plan for the entire Yellowstone River," he adds.

"From among conflicting goals and objectives, alternatives will be evaluated and a balanced and implementable plan for the economic, environmental, and social well-being of the residents of the Clarks Fork area and the rest of the nation will be recommended," Corrigall says.

Input from the general public will be sought throughout the throughout the study.

In Montana the total study will cover the Yellowstone River Basin and adjacent coal areas and will include 21 counties. The final plan will cover over 125,000 square miles of the Yellowstone River Basin in Montana, Wyoming, and North Dakota.

Meeting Set Here

An information and public participation meeting has been scheduled in the Red Lodge City Hall at 7:30 p.m. Wednesday, Feb. 4. The general public is invited to attend the meeting and to participate in the discussions on the planning program for the Clarks Fork area.

Further information may be obtained from Keith H. Corrigall, Missouri River Basin Commission, 32 S. Ewing, Helena, 59601.

Sanitary Regulations Corrected

1/5/76

Last week's Carbon County News report of the county planning board's meeting contained several inaccuracies, according to Rod Fink, county sanitarian.

Mr. Fink, referring to the last paragraph's description of new state regulations on septic tanks and drainfields, says the regulations do not call for tanks to be at least six feet above the water table and 100 feet from the high-water mark of nearby streams, as stated by a planning board member.

Rather, he says, the regulations require drainfields to be at least four feet above the water table and 100 feet from streams.

Mr. Fink also took issue with the implication that incinerator toilets and holding vaults may be substituted where septic systems are not allowed. He said incinerator toilets are "no panacea," and that holding vaults probably will not be allowed except under special conditions. Specifically not allowed where development could threaten water quality are cesspools, seepage pits, deep drainfields, or deep sand filters.

Persons planning to build near any water supply, without benefit of municipal sewerage facilities, should contact Mr. Fink for information on regulations and permits.

Carbon County plans its future

By GARY SVEE
Of The Gazette Staff

RED LODGE — Carbon County has come up with a plan it hopes will strengthen the county's agricultural base and still provide recreational opportunities for those drawn to the beauty of the mountain county.

The county's comprehensive plan, compiled by the Carbon County Planning Board Staff, has been completed and is ready for review by the county's 8,500 citizens.

Staff Director Jack L. Gribble said a public meeting has been scheduled for 7:30 p.m. Thursday at the courtroom in the county courthouse as the first step in the review process.

The plan calls for a 13-item action program formed basically at land-use planning and regulations and social and economic planning.

The program includes:

- A coordination of planning efforts by county officials and other large landowners in the county, including federal and state governments and the Burlington Northern.
- A continuing education program for the county's citizens to insure that they are informed of current situations and recommendations.
- Efforts to attract light, non-polluting industries to solve the problems of unemployment and underemployment now faced by many of the county's residents.
- Strong subdivision regulations and land-use ordinances that would retain prime agricultural lands, the economic backbone of the county, in their present use.
- Enforcement of federal and state laws and possible enactment of local laws to insure that any mineral development in the county is consistent with the "existing agricultural, recreational, and residential flavor of the area."
- The preservation of adequate and clean supplies of water throughout the county through a countywide water quality survey.
- The establishment of mini-bus routes to link the county with a daily transportation system.
- A study of possible solid waste disposal systems.
- The drafting of a Capital Improvement Program (CIP), including a review of all potential revenue and the costs of projects on a priority basis.
- Subdivision regulations that would limit recreational development to areas suited for development and protect agricultural and fragile lands from recreational development.
- Inventory historical sites to preserve them for future generations.
- Future planning.

Unfit to Drink

The Old Prospector was in the Carbon County News office this week to complain that the condition of Red Lodge water is ruining his famous sourdough pancakes. What with all the chlorine needed to make the water safe to drink, it has been stopping his starter.

He further noted that one of his buddies is having a similar problem with his famous coffee. With so much mud in it, it's getting to taste worse than panther stuff.

And yet another acquaintance won't even wash with the water for fear of catching diabetes. He won't go fishing for the same reason, so the Old Prospector says.

The man's point, of course, is that the city waterworks just don't work in high waters, never have, and never will — and the time for correcting the problem is long past due.

He might also have wondered how come Carbon County can get $70,000 in federal funds to study water (as reported last week by Congressman John Melcher), but we can't come up with money to make water fit to drink.

CLARKS FORK RIVER TO BE DISCUSSED

HELENA — The second in a series of meetings to discuss planning objectives for the Clarks Fork of the Yellowstone River has been scheduled by the Missouri River Basin Commission.

The purpose of the meeting is to offer the opportunity for the Wyoming and Montana people in the Clarks Fork area to jointly discuss potential needs for the basin, various development and environmental projects that have been proposed in both Wyoming and Montana, and other matters of interest pertaining to the Level B planning program for the basin. In addition to the general public, there will be representatives from the various federal and state agencies involved in the planning program in attendance to answer questions and to discuss their agencies' programs.

The meeting is scheduled for 10:00 a.m., Wednesday, March 24, 1976 in Room 4, Liberal Arts Building, Northwest Community College, Powell, Wyoming.

Further information may be obtained from Keith H. Corrigall, Missouri River Basin Commission, 32 S. Ewing, Helena, Montana 59601, Telephone (406) 449-2872

3/18/76 Bridger

I. HISTORICAL OVERVIEW

CARBON COUNTY

The economic and demographic characteristics of Carbon County are closely related to its economic dependence on agriculture. The two primary occurrences in agricultural regions over the decade of the 1960s were declining employment and relatively low income levels. This pattern also dominated the economic situation in Carbon County.

Between 1960 and 1970, employment decreased by over 500 positions, or nearly 20 percent, with most of the loss occurring in the agricultural sector (1960 and 1970 Census of Population, various volumes). The immediate response was population decline of 14.9 percent and a net out-migration of 15.4 percent. It may be hypothesized that most of the out-migrating persons were younger persons in search of greater employment opportunity elsewhere. This is supported by observation of the age distributions within the county (Tables I-1 and I-2). The median age of residents increased by 4.3 years between 1960 and 1970, and the proportion of retirement and near-retirement age persons increased significantly. Indeed, 44.3 percent of all residents of Carbon County in 1970 were 45 years old or older in 1970, as compared to 30.5 percent in the nation.

The economic implications of the worsening employment situation were low income levels relative to the state and the nation and increased unemployment. In 1970 nearly 15 percent of the resident families had incomes at poverty level or lower. This is compared to a proportion of less than 11 percent in the country.

The trend since 1970 has reversed. Agricultural employment is still declining, but the county's economy has experienced decreasing, although still very high, dependence on agriculture. In the first half of the 1970s, the economy has seen the development of some of the county's large recreation and tourism potential. The southwestern corner of the county is part of the Beartooth Mountains--a high, beautiful range of the Northern Rockies. The land immediately adjacent to the north and east has lovely scenery and large, fish-laden rivers. The rivers and mountains have received considerable attention in recent years and have stimulated recreation and tourism use within the county. The use includes weekend fishing and camping, winter skiing, and second-home building. In addition, many workers in Yellowstone County have purchased homes in Carbon County and commute to their jobs (Carbon County planner, personal communication, May, 1976).

The result of the recreation use has been increased diversity within the economy of the county, increased employment, and increased population.

TABLE I-1

AGE DISTRIBUTION IN THE MYAPO REGION
MONTANA, AND THE UNITED STATES
1960

	All Ages	0-14 Years	15-44 Years	45-64 Years	65 and over
Big Horn					
Persons	10,007	3,819	3,769	1,680	739
% of Total	100.0	38.2	37.7	16.8	7.4
Median Age	22.8				
Carbon					
Persons	8,317	2,454	2,712	1,902	1,249
% of Total	100.0	29.5	32.6	22.9	15.0
Median Age	35.5				
Stillwater					
Persons	5,526	1,759	1,935	1,172	660
% of Total	100.0	31.8	35.0	21.2	11.9
Median Age	31.3				
Sweet Grass					
Persons	3,290	970	1,085	736	499
% of Total	100.0	29.5	33.0	22.4	15.2
Median Age	34.0				
Yellowstone					
Persons	79,016	27,616	31,933	13,637	5,830
% of Total	100.0	34.9	40.4	17.3	7.4
Median Age	26.6				
MYAPO Region					
Persons	106,156	36,618	41,434	19,127	8,977
% of Total	100.0	34.5	39.0	18.0	8.5
Montana					
Persons	674,767	227,192	256,931	125,224	65,420
% of Total	100.0	33.7	38.1	18.6	9.7
Median Age	27.6				
United States					
Persons	179,323,175	55,786,173	70,919,666	36,057,756	16,559,580
% of Total	100.0	31.1	39.5	20.1	9.2

Note: Percentages may not total 100 because of rounding.

Sources: U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1964).

U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: Montana (Washington, D.C. U.S. Government Printing Office, 1963).

TABLE I-2

AGE DISTRIBUTION IN THE MYAPO REGION
MONTANA, AND THE UNITED STATES
1970

	All Ages	0-14 Years	15-44 Years	45-64 Years	65 and over
Big Horn					
Persons	10,057	3,570	3,935	1,859	693
% of Total	100.0	35.5	39.1	18.5	6.9
Median Age	23.4				
Carbon					
Persons	7,080	1,722	2,220	1,907	1,231
% of Total	100.0	24.3	31.4	26.9	17.4
Median Age	39.8				
Stillwater					
Persons	4,632	1,208	1,588	1,152	684
% of Total	100.0	26.1	34.3	24.9	14.8
Median Age	35.5				
Sweet Grass					
Persons	2,880	735	1,002	749	494
% of Total	100.0	24.7	33.6	25.1	16.6
Median Age	37.1				
Yellowstone					
Persons	87,366	26,175	36,873	17,254	7,064
% of Total	100.0	30.0	42.2	19.7	8.1
Median Age	26.2				
MYAPO Region					
Persons	112,115	33,410	45,618	22,921	10,166
% of Total	100.0	29.8	40.7	20.4	9.1
Montana					
Persons	694,409	207,930	276,745	140,998	68,736
% of Total	100.0	29.9	39.9	20.3	9.9
Median Age	27.1				
United States					
Persons	203,210,158	58,017,845	83,270,951	41,820,193	20,101,169
% of Total	100.0	28.6	41.0	20.6	9.9
Median Age	28.1				

Note: Percentages may not total 100 because of rounding.

Sources: U.S. Bureau of the Census, Census of Population: 1970, Detailed Characteristics: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1973).

U.S. Bureau of the Census, Census of Population: 1970, General Population Characteristics: Montana (Washington, D.C.: U.S. Government Printing Office, 1971).

A. POPULATION

There are three characteristics of the population which are important in the identification of regional patterns and which are especially helpful in population projections. These characteristics are discussed below and include: 1) number of inhabitants; 2) racial composition; and 3) sex and age composition. The first of these--number of inhabitants--is discussed with emphasis on two time periods, the 1960s and the first half of the 1970s. The experiences in each of these periods were dissimilar in all five counties. The second characteristic--racial composition--is important in understanding the region's population because of its influence on fertility rates and migration rates. Sex and age composition in the region are presented third. These give additional insight into demographic conditions.

B. Employment

Employment in 1960 and 1970, as reported by the Bureau of the Census, is shown in Table I-6 (comparable data are not available for 1975). Employment increased in the MYAPO region by 7.2 percent during the 1970s. This increase is similar to that of Montana (7.4 percent), but it is less than half of the percentage increase in the United States as a whole (18.4 percent). Employment, then, increased much more slowly in the region than it did elsewhere in the nation. The net out-migration from the region noted above can be seen as a direct result of the region's slow economic growth compared to other areas.

As might be expected, employment changes over the decade of the 1960s were not uniform throughout the region. The three counties which are dependent on agriculture had very different experiences from the region as a whole. Carbon and Stillwater Counties experienced substantial declines in employment over the ten-year period, primarily due to decreased employment in agriculture. The total decrease was 984 persons in both counties, 531 of which had been in agriculture (1960 and 1970 Census of Population, various volumes). The other primarily agricultural county, Sweet Grass, experienced a minor increase in employment of 41 positions, or 3.4 percent over 1960. This increase was minimal and was a result of increased construction in the county.

TABLE I-3

POPULATION OF THE MYAPO REGION AND EACH COUNTY,
1960, 1970, AND 1975

County	1960	1970	Percentage Change 1960-1970	1975	Percentage Change 1970-1975	Percentage Change 1960-1975
Big Horn	10,007	10,057	0.5	10,900	8.4	8.9
Carbon	8,317	7,080	-14.9	7,700	8.8	-7.4
Stillwater	5,526	4,632	-16.2	5,300	14.4	-4.1
Sweet Grass	3,290	2,980	-9.4	2,900	-2.7	-11.9
Yellowstone	79,016	87,366	10.6	97,300	11.4	23.1
MYAPO Total	106,156	112,115	5.6	124,100	10.7	16.9
Montana	674,767	694,409	2.9			
U.S.	179,323,175	203,211,926	13.3			

Source: U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1964).

U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: Montana (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, Census of Population: 1970, Detailed Characteristics: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1973).

U.S. Bureau of the Census, Census of Population: 1970, General Population Characteristics: Montana (Washington, D.C.: U.S. Government Printing Office, 1971).

U.S. Bureau of the Census, "Population Estimates and Projections", Current Population Reports-Series P-26 (Washington, D.C.: U.S. Government Printing Office, 1975).

TABLE I-4

RACIAL COMPOSITION OF MYAPO REGION POPULATION
1960 and 1970

County	White		Indian		Other Non-white	
	Number	% of Total	Number	% of Total	Number	% of Total
Big Horn						
1960	6584	65.8	3334	33.3	89	0.9
1970	6018	59.8	3917	39.0	122	1.2
Carbon						
1960	8300	99.8	5	0.1	12	0.1
1970	7022	99.2	29	0.4	29	0.4
Stillwater						
1960	5511	99.7	12	0.2	3	0.1
1970	4595	99.2	23	0.5	14	0.3
Sweet Grass						
1960	3290	100.0	---	---	--	---
1970	2978	100.0	2	---	--	---
Yellowstone						
1960	78227	99.0	410	0.5	379	0.5
1970	85765	98.2	1063	1.2	539	0.6
MYAPO Region Total						
1960	101912	96.0	3761	3.5	483	0.5
1970	106378	94.9	5034	4.5	704	0.6
Montana						
1960	650538	96.4	21181	3.1	3048	0.5
1970	663043	95.5	26385	3.8	4981	0.7
United States						
1960	158,837,679	88.6	523,591	0.3	19,964,405	11.1
1970	178,119,221	87.6	763,594	0.4	24,327,343	12.0

Sources: U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1964).

U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: Montana (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, Census of Population: 1970, Detailed Characteristics: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1973).

TABLE I-5

SEX DISTRIBUTION BY COUNTY AND REGIONAL TOTAL
1960 and 1970

	Male		Female	
County	Number	%	Number	%
Big Horn				
1960	5,032	50.3	4,975	49.7
1970	4,990	49.6	5,067	50.4
Carbon				
1960	4,203	50.5	4,114	49.5
1970	3,559	50.3	3,521	49.7
Stillwater				
1960	2,863	51.8	2,663	48.2
1970	2,338	50.5	2,294	49.5
Sweet Grass				
1960	1,689	51.3	1,601	48.7
1970	1,556	52.2	1,424	47.8
Yellowstone				
1960	38,843	49.2	40,173	50.8
1970	42,459	48.6	44,907	51.4
MYAPO Region Total				
1960	52,630	49.6	53,526	50.4
1970	54,902	49.0	57,213	51.0
Montana				
1960	343,743	50.9	331,024	49.1
1970	347,005	50.0	347,404	50.0
United States				
1960	88,331,494	49.3	90,991,681	50.7
1970	98,912,192	48.7	104,299,734	51.3

Sources: U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1964).

U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: Montana (Washington, D.C.: U.S. Government Printing Office, 1963).

TABLE I-6

LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT RATE OF THE MYAPO REGION, MONTANA, AND THE UNITED STATES 1960 and 1970

	Civilian Labor Force		Employment		U/LF	
	1960	1970	1960	1970	1960	1970
Big Horn	3,265	3,317	2,941	3,163	9.9%	4.6%
Carbon	3,053	2,524	2,940	2,393	3.7%	5.2%
Stillwater	2,010	1,617	1,966	1,529	2.2%	5.4%
Sweet Grass	1,268	1,276	1,208	1,249	4.7%	2.1%
Yellowstone	31,518	34,996	29,470	32,966	6.5%	5.8%
MYAPO Region	41,114	43,730	38,525	41,300	6.3%	5.6%
Montana	248,073	270,834	231,270	248,342	6.8%	8.3%
United States	68,144,079	80,051,046	64,639,252	76,553,599	5.1%	4.4%

Sources: U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: Montana (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, Census of Population: 1970, General Social and Economic Characteristics. Final Report PC(1)-C28 Montana. (Washington, D.C.: U.S. Government Printing Office, 1971).

U.S. Bureau of the Census, Census of Population: 1960, Characteristics of the Population: U.S. Summary (Washington, D.C.: U.S. Government Printing Office, 1964).

U.S. Bureau of the Census, Census of Population: 1970, Detailed Characteristics: U. S. Summary (Washington, D.C.: U. S. Government Printing Office, 1973).

TABLE I-7

UNEMPLOYMENT RATES
MYAPO REGION, MONTANA, AND THE UNITED STATES
1970 THROUGH 1975

	Four-County Region*	Yellowstone County	Montana	United States
1970	5.4	5.2	5.5	4.9
1971	6.3	5.5	6.3	5.9
1972	6.9	5.6	6.2	5.6
1973	6.9	5.1	6.3	4.9
1974	7.1	5.3	6.7	5.6
1975	7.3	6.7		

*Big Horn, Carbon, Stillwater, and Sweet Grass Counties combined.

Source: Montana and United States data from: Manpower Report of the President, U.S. Government Printing Office, Washington, D.C., April 1975, p. 230, and p. 298, respectively.

MYAPO Region data from: State of Montana Employment Security Division, Montana's 14 Major Labor Market Areas, Helena, January, 1976, pp 24-5, 94-5.

TABLE I-10

MEDIAN FAMILY INCOME
MYAPO REGION, MONTANA, AND THE UNITED STATES
1960 and 1970

	Median Family Income			
	1960		1970	
	Current dollars	Constant[a] 1958 dollars	Current dollars	Constant[b] 1958 dollars
Big Horn	$4,375	$4,252	$7,310	$5,634
Carbon	4,336	4,214	6,578	5,087
Stillwater	4,790	4,655	6,752	5,222
Sweet Grass	4,333	4,211	6,530	5,050
Yellowstone	6,150	5,977	8,966	6,934
Montana	5,403	5,251	8,512	6,583
United States	5,660	5,500	9,596	7,422

[a]Calculated using 1960 personal consumption deflator of 102.9

[b]Calculated using 1970 personal consumption deflator of 129.3. Deflators from Economic Report of the President, (Washington, D.C.: U.S. Government Printing Office, February 1974), p. 252.

II. THE BASIC INDUSTRIES OF THE MYAPO REGION

A. AGRICULTURE

The Yellowstone River valley crosses the MYAPO region in an east-west direction and is a fertile farmland belt. The agricultural history of the valley dates back to the first permanent settlements and has been the single most significant factor in the settlement and tradition of the area. The role of agriculture in the economy has declined somewhat over the last 15 years, but it is still the single most important economic sector in four of the five MYAPO counties.

Table II-1 presents the agricultural employment of the counties for 1973, the last year for which county specific data are available. It is evident that each of the counties except Yellowstone derives a large portion of its employment from agriculture. Yellowstone County has the largest absolute amount of agricultural employment of any single county, but the county's economy is so diverse that agriculture accounts for less than four percent of total employment. The other counties have less total agricultural employment but in each case the proportion of total employment is approximately one-third.

TABLE II-1

AGRICULTURAL EMPLOYMENT
1973

	Agricultural Employment	% of Total Employment
Big Horn	1095	28.2
Carbon	967	31.2
Stillwater	679	36.2
Sweet Grass	467	31.6
Yellowstone	1689	3.9
MYAPO Region	4897	9.2

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information Service, Summary Data Tapes.

The agricultural sector has experienced considerable change over the 15-year period since 1960. Its dominance in 1973 is clear, but its importance has declined from earlier years. Table II-2 presents Census employment figures for 1960 and 1970.[1] In each county except Sweet Grass the absolute amount of employment and the proportion of the total decreased significantly.

There were several forces which acted to bring about a decrease in agricultural employment. First, the long-standing trend toward mechanization has decreased the dependence on labor. Mechanization has also resulted in larger farms. The average farm size in Montana was 2104 acres in 1960 and 2432 in 1970 (Montana Department of Agriculture and Statistical Reporting Service, 1974:8). This causes a decrease in the number of farms and, thus, the amount of agricultural employment.

TABLE II-2

AGRICULTURAL EMPLOYMENT
1960 and 1970

	1960		1970	
	Agricultural Employment	% of Total	Agricultural Employment	% of Total
Big Horn	1195	40.6	885	28.0
Carbon	954	32.4	696	29.1
Stillwater	695	35.4	409	26.7
Sweet Grass	492	40.7	491	39.3
Yellowstone	1928	6.5	1410	4.3

Source: U.S. Bureau of the Census, U.S. Census of Population: 1960, Characteristics of the Population: Montana (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, U.S. Census of Population: 1970, General Population Characteristics: Montana (Washington, D.C.: U.S. Government Printing Office, 1971).

[1]These data are compiled from the principal industry affiliation of employed persons whereas the Bureau of Economic Analysis (BEA) data given in Table II-1 are compiled on an establishment basis by number of jobs. Because of differences in definitions and data sources, the data in the two tables are not directly comparable.

The trends toward mechanization and large farms is a national, if not world-wide, trend. There are other pressures on agriculture which are less universal. The largest of these is competition with other land uses. The development of recreation and tourism in the counties has led to greatly increased land values. Farming does not generate enough profit to allow purchasing of land at residential prices. As a result, when a farmer retires or sells his farm, the purchaser is not another farmer but is more likely to be a developer or speculator. It follows, then, that there is less land in agricultural production from year to year. Another cause of reduced employment is the recent instability of the market. Prices and costs have fluctuated rapidly, and farming has been discouraged as a profession (McFarland, personal communication, June 2, 1976).

The net result of changes in the agricultural profession is economic hardship for areas that have historically been largely dependent on it. These trends are likely to continue, and agriculture will provide an increasingly smaller portion of income and employment in the MYAPO region.

B. MINING

Mining has historically been an important part of the economic base of Montana, and the MYAPO region is no exception. There was an important coal mining industry in Carbon County, chrome was mined in Stillwater County during World War II, and oil and gas exploration and production have occurred regularly throughout the region. In the last few years, interest in coal development has increased manyfold; there is much renewed interest in chrome and platinum mining in the Stillwater Complex, and there are promising indications of significant new oil finds in deep wells on the east face of the mountains in Stillwater, Sweet Grass, and Carbon Counties.

1. Coal

In 1974 Carbon County was estimated to contain more than 53 percent of Montana's reserve base of bituminous coal of approximately 1400 million tons ("Historical Coal Statistics for Montana," n.d.: 6). Most of these reserves lie in 12 veins ranging in depth from a few feet to 1500 feet below the surface in the Fort Union formation. In the 1930s and 1940s, these reserves were the basis for a coal mining industry which at its peak is reported to have employed over 3000 people from Washoe to Bearcreek (Ozinga, personal communication, May, 1976). As can be seen from the production data

in Table II-3, however, annual production was less than 200,000 tons by 1950; and, production had, for all practical purposes, ended by the mid-1950s. The decline of the industry was due to a combination of factors which included a mine disaster in 1943 in which 74 people lost their lives and the increasingly uncompetitive position of western coal mined underground relative to Appalachian strip-mined coal.

TABLE II-3

COAL PRODUCTION IN THE MYAPO REGION
(tons)

	Carbon County	Big Horn County
1950	198,781	----
1955	20,017	----
1960	11,085	----
1965	25,684	----
1970	----	74,856
1971	----	----
1972	----	792,949
1973	----	4,159,287
1974	----	8,332,038
1975	----	13,331,433

Source: Montana Energy Advisory Council, "Historical Coal Statistics for Montana", n.d., p. 15.

However, events of the past five years make it likely that coal may play an even larger role in the future of the region than it has played in the past. Rapidly rising energy prices together with sulphur oxide emission regulations have combined to make the recovery of strippable deposits of western lignite and subbituminous coal economically feasible. Montana contains over 50 percent of the total United States reserves of low sulphur ($\leq$ 1.0 percent) strippable reserves; and, of these, over 25 percent are located in Big Horn County ("Historical Coal Statistics for Montana," n.d.: 2,8). As is evident from the production data in Table II-3, large quantities of coal were already being mined in 1975 (about two-thirds by the Decker Coal Company and one-third by Westmoreland Resources),

C. RECREATION-TOURISM

Recreation and tourism are relatively easy to define qualitatively but very difficult to define operationally. The economic sectors which serve recreation and tourism generally serve the resident population as well. The trade and service sectors of the economy serve the needs of the area's residents and, in that sense, are nonbasic industries. However, whenever the customers of the trade and service sectors are non-residents who are traveling through the area or who have the area as a destination other than for permanent residence, the demand is from outside the area and thus these sectors are basic.

It is impossible to determine exactly the extent to which the trade and service sectors respond to each demand. A fairly accurate approach, whenever personal interview of each individual proprietor is not possible, is to compare an area's employment in the trade and service sectors to such employment in other areas of the same population. If employment is comparatively high, most of the excess may be attributed to recreation and tourism demand. This procedure was applied to the MYAPO region with results as shown in Table II-4.

TABLE II-4

RECREATION AND TOURISM EMPLOYMENT
MYAPO REGION
1973

	Total Trade Employment[a]	Basic Trade Employment[b]	Total Services Employment[a]	Basic Services Employment[b]
Big Horn	522	133	448	---
Carbon	366	197	272	72
Stillwater	214	18	128	3
Sweet Grass	273	140	152	35
Yellowstone	11,444	---	7,566	---
MYAPO Region	12,819	488	8,566	110

[a] U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, Summary Data Tapes.

[b] Mountain West Research, Inc.

The recreation and tourism in Carbon County take on a somewhat different character. There is some through-traffic because Highway 212 is the shortest route to Yellowstone National Park for travelers coming from the east on I-90. This traffic generates some employment in lodging, gas stations, and eating places especially in Red Lodge (Gribble, personal communication, June 2, 1976). In addition to this, there are attractions within the county which are the destinations of travelers. The high, rugged, alpine Beartooth Mountain Range of the Northern Rockies is included in Custer National Forest and is the site of 14 Forest Service campgrounds and many picnic and trail facilities. Use within the National Forest totaled over 300,000 visitor-use-days in 1975. It is estimated that this figure has more than doubled in ten years (Wetzsteon, personal communication, May 27, 1976). There are also several rivers in the county, most notably Rock Creek, which provide recreation for fishing. Big-game and small-game hunting are also quite popular.

The Beartooth Face is the site of the Grizzly Peak Ski Area near Red Lodge. The facilities include a restaurant, two bars, a ski school, several slopes, and equipment sales and rental. Use has increased considerably since 1970, and there was a 10 percent increase in the 1975-1976 season from the previous year. It is expected that continued growth will result in the construction of a lodge at the base of the mountain. Employment at the ski area accounts for 53 employees, adjusted to a full-time equivalent basis (Gribble, personal communication, June 7, 1976).

All of the above mentioned attractions increase sales at many trade and service facilities and stimulate new employment in lodging, eating, and gas sales particularly in Red Lodge. Recreation and tourism also stimulate another type of employment. Carbon County has had a considerable boom in second-home development since 1970. It is thought that residents of Yellowstone County as well as people from other Montana counties and adjoining states have built second homes in the county, primarily along the rivers, for use in the summer. This has resulted in increased employment in construction as well as in the more commonly affected trade and service sectors (Gribble, personal communication, May 27, 1976).

All in all, Carbon County has experienced a rapid, recent growth in recreation and tourism activity. This has increased employment in trade, service, and construction and has brought about an economic upswing.

III. THREE ALTERNATIVE FUTURES FOR THE MYAPO REGION

The preceding section has described alternative employment scenarios for the basic industries in each of the five counties. The purpose here is to combine them so that their aggregate implications can be examined for the communities in the region. Alternative Future 1 (AF1) and Alternative Future 3 (AF3) are easy to describe because they simply represent the combination of the lowest scenarios and highest scenarios for each industry. For an industry like agriculture that only has a single scenario, the same numbers are entered for each AF, but for many of the basic industries, there is a substantial difference between the low and the high scenarios. The largest variations occur in oil refining, coal mining, and hard rock mining.

Alternative Future 2 (AF2), on the other hand, is more difficult to characterize. In the case where there is only a single scenario for an industry, there is obviously no interpretation problem. Where there are three industry scenarios, AF2 uses Scenario 2. Where there are two industry scenarios, AF2 uses the scenario felt to be more probable. There are three sectors for which there are only two scenarios--meat packing, oil and gas, and federal government. For meat packing the low scenario is felt to be more probable than Scenario 2. People have always talked of new packing operations in Billings; but, given the basic economic forces acting on the industry and given the vulnerability of the existing two firms to adverse market developments, Billings will be doing well to meet the assumptions of Scenario 1. For oil and gas, Scenario 2 is still fairly conservative and, as explained in the previous section, is thought to be more probable than Scenario 1. Finally, federal government employment under Scenario 2 is thought to be more likely than under Scenario 1. Much of the federal government's activity in the MYAPO region is oriented toward natural resources management that will be affected by western energy development or toward Indian Trust responsibilities which are becoming more complex and more demanding. For these reasons, the 2½ percent annual increase hypothesized in Scenario 2 for the key resource management and Indian-related agencies does not seem at all excessive.

A. COUNTY PROJECTIONS

The county-specific projections demonstrate more variability than the regional projections. In general, the smaller counties are more susceptible to employment changes in any single basic sector than is Yellowstone County or the region as a whole. The result is that differences among the projections for the three alternative futures are large in the smaller counties.

AF1 - Refinery Scenario 1. No condensates, no Alaskan crude. Conoco and Farmers' Union close. Probability approximately .07.

AF2 - Refinery Scenario 2. Condensate exports continue, but no Alaskan crude. Farmers' Union closes. Probability approximately .60.

AF3 - Refinery Scenario 3. Pipeline is built and Alaskan crude can be refined in Billings. No refinery closures. Probability approximately .33.

1. Carbon County

Several items should be noted about the Carbon County projections. Alternative Future 1 is identical to AF2 except for increased employment in oil and gas mining. AF2 and AF3, as input into the model, are identical. As a result, employment and personal income projections are the same for AF2 and AF3.

However, population projections differ for AF2 and AF3 as a result of workers in Yellowstone County moving to the county and commuting to Laurel and Billings.

Carbon County projections demonstrate stability and gradual growth with very little difference among the alternative futures. In each AF, population declines in 1976 as a result of the closing of Red Lodge cannery. Population growth over the entire period under each AF is slight, as is employment growth (Table III-1). However, total personal income (Table III- 2) more than doubles and personal income per capita almost doubles. Average annual growth of PI per capita under all alternative futures is 3.3 percent, much higher than growth in employment or population.

TABLE III-1

EMPLOYMENT PROJECTIONS FOR CARBON COUNTY

Year	Alternative Future 1	Alternative Future 2	Alternative Future 3
1975	3082	3074	3082
1980	3092	3225	3225
1985	3240	3369	3370
1990	3460	3585	3586
1995	3763	3886	3886

Source: Mountain West Research, Inc.

TABLE III-2

PERSONAL INCOME PROJECTIONS FOR CARBON COUNTY

Year	Alternative Future 1		Alternative Future 2		Alternative Future 3	
	Total	PerCapita	Total	PerCapita	Total	PerCapita
1975	$34,617,438	$4499	$34,536,462	$4488	$34,619,505	$4498
1980	40,299,685	5435	41,401,800	5378	41,404,435	5375
1985	48,151,904	6277	49,302,271	6212	49,304,205	6210
1990	58,094,836	7338	59,297,390	7269	59,298,979	7267
1995	70,791,310	8633	72,063,634	8545	72,065,105	8544

Source: Mountain West Research, Inc.

2. Community Population Projections

The projections for some of the communities in each county except Yellowstone experience population changes based entirely on natural growth or decline. All communities which were not part of the basic employment residential allocation are assumed not to have in- or out-migrants and thus reflect only deaths, births, and educational migrants. Those communities to which migration is allocated have much more fluctuation in population, both upward and downward.

In Carbon County, Bridger, Joliet and Red Lodge are allocated portions of the migration. In addition, the first two communities and Fromberg receive a portion of the Yellowstone County employment-related migration. Roberts and Bearcreek, because they are not part of this allocation scheme, experience small declines in population over the 20-year period.

In summary, projections for MYAPO region communities demonstrate the same relative vulnerability as their respective counties. Communities in outlying counties experience either gradual declines or demonstrate extreme vulnerability to employment level changes, particularly in response to mining activity. Carbon County is projected to have more steady growth because no large, immediate changes in basic employment are foreseen. Yellowstone County communities grow at a steady pace, again mirroring the diversity of the economic base of the county.

TABLE III-3

COMMUNITY POPULATIONS, 1970 AND 1975
MYAPO REGION

	1970 Population	1975 Population Estimate
BIG HORN COUNTY		
Busby	300	300
Crow Agency	1000	1400
Fort Smith	150	150
Hardin	2733	3000
Lodge Grass	806	875
Pryor	50	50
St. Xavier	100	100
Wyola	125	95
CARBON COUNTY		
Bearcreek	31	60
Bridger	717	825
Fromberg	364	425
Joliet	412	550
Red Lodge	1844	2000
Roberts	200	250
STILLWATER COUNTY		
Absarokee	600	700
Anaconda Mine Site	0	25
Columbus	1173	1350
Fishtail	15	15
Johns-Manville Mine Site	0	25
Nye	10	10
Park City	430	600
Reedpoint	133	175
SWEET GRASS COUNTY		
AMAX Mine Site		25
Big Timber	1592	1750

IV. THE BASIC INDUSTRIES OF THE MYAPO REGION AND THEIR VULNERABILITY TO CHANGES IN WATER QUALITY STANDARDS OR WASTE WATER CONTROL PROCEDURES

There are three industries which have historically had waste water disposal problems. The first of these is agriculture which has both point and non-point waste discharges. The second is mining which has recently received widespread attention as a result of illegal discharges. The third consists of the three large manufacturing industries in Yellowstone County, oil refining, sugar refining, and meat packing, each of which has considerable waste water discharge, although each has installed pretreatment facilities and is, or is about to discharge directly into municipal sewer systems.

Agricultural discharges are by far the most difficult to evaluate or regulate because many of the associated pollutants are from non-point sources or from contamination of ground water.

A. AN EXAMPLE INVOLVING A REDUCTION IN AGRICULTURAL EARNINGS IN CARBON COUNTY

Suppose that a NPS waste water control plan were proposed which was not expected to cause any reduction in employment but which caused an increase in costs for farmers. The implication is that farm income would be lower; and, although it would not affect agricultural employment, the lower level of farm income would cause PI to fall which would, in turn, cause nonbasic employment to fall. Assume that the plan to be evaluated causes total agricultural earnings per worker to be lower by five percent and that the reduction is applied every year beginning in 1974. This means that earnings per worker are reduced by five percent in the first year and that the new lower level of earnings per worker is reduced by five percent again in the next year.

Table IV-1 shows the effects of the reduction in farm earnings on population, employment, and income in Carbon County. The total reduction in farm income approaches $9 million in 1995 which causes population and employment to fall, but the interesting thing to note is how much smaller the income multiplier is in Carbon County relative to Yellowstone County. The reason is that much of the income decrease in Carbon County gets channeled out of the Yellowstone County total. In fact, if we look at Yellowstone County under the effect of the reduction in Carbon County, we can see the effect of reduction in market area personal income. The important point is that one cannot determine what the consequences of a waste water control plan will be on a particular industry; but, once the impact on a particular industry has been defined, the model can trace out the implications of that impact for the economy of the region.

TABLE IV-1

EVALUATION OF THE EFFECT OF A REDUCTION IN FARM EARNINGS PER WORKER IN CARBON COUNTY[a]

	Carbon County AFl				Carbon County AFl Agricultural Earnings Reduced			
	Population	Employment	Basic Income (000)	Personal Income (000)	Population	Employment	Basic Income (000)	Personal Income (000)
1973	7253	2851	$13,790	$33,939	7253	2851	$13,790	$33,939
1974	7430	2982	11,628	32,929	7403	2971	11,224	32,487
1975	7695	3082	11,961	34,617	7638	3058	11,154	33,716
1976	7514	3075	12,159	35,646	7427	3038	10,952	34,278
1977	7464	3063	12,542	36,626	7375	3013	10,937	34,800
1978	7417	3066	12,941	37,747	7325	3006	10,939	35,472
1979	7370	3078	13,433	38,998	7276	3009	11,035	36,280
1980	7415	3092	13,937	40,299	7226	3014	11,145	37,137
1985	7671	3240	16,857	48,151	7375	3103	12,118	42,636
1990	7917	3460	20,550	58,094	7543	3275	13,865	50,229
1995	8200	3763	25,219	70,791	7750	3532	16,584	60,483

[a]All income data expressed in constant 1973 dollars

Source: Mountain West Research, Inc.

TABLE IV-1 (continued)

Carbon County: Effect of Change

	Change in Basic Income	Change in Population	Change in Employment	Change in Personal Income	Change in Personal Income / Change in Basic Income
1973	-----	----	----	-----	-----
1974	$ - 404	- 27	- 11	$ - 442	$ 1.09
1975	- 807	- 57	- 24	- 901	1.12
1976	-1207	- 87	- 37	- 1,368	1.13
1977	-1607	- 89	- 50	- 1,826	1.14
1978	-2002	- 92	- 60	- 2,275	1.14
1979	-2398	- 94	- 69	- 2,718	1.13
1980	-2792	-189	- 78	- 3,162	1.13
1985	-4739	-296	-137	- 5,512	1.16
1990	-6685	-374	-185	- 7,865	1.18
1995	-8635	-450	-231	-10,308	1.19

Source: Mountain West Research, Inc.